

13. Numbering Resource Administration

Mandate of the Authority

The mandate to establish, control and manage the national electronic communication numbering plan for network and application services is provided under Section 65 of the Electronic Communications Act 775 and is reiterated in section 3(w) of the NCA Act 769. Pursuant to this mandate the NCA developed and continuously updates a framework, known as the National Electronic Numbering Plan (NECNP), used to manage numbering resources in Ghana. It defines among other things the type and format of numbering resources.

This framework also empowers the Authority to determine criteria for eligibility as well as guidelines on management of the various numbering resources created therein.

Under these provisions, the Authority has sufficient responsibility to ensure that access to electronic communication services persists both locally and internationally over interconnected networks.

Numbering Administration

Telephony Numbering Resources are string of numbers and/or alphanumeric used to address electronic communication terminals, networks, protocols or applications.

Being a finite national resource, the NCA regulates the use of various numbering resources and provides the procedure for applying for those resources by service providers; some of which include:

1. Network destination codes (NDC): part of the National Number which identifies the network or a range holder.
2. Mobile Station International Subscriber Directory Number (MSISDN): is a number used to identify a mobile phone number internationally. This number includes a country code (CC) and a National Destination Code (NDC) which identifies the subscriber's operator.
3. Mobile Network Codes (MNC): The Mobile Country Code (MCC) consists of 3 decimal digits and the Mobile Network Code consists of 2 or 3 decimal digits.
4. Machine-to-Machine Numbering Resources (M2MNR): Numbering resources specifically allocated for machine-to-machine communications services.
5. Geographic Numbering Resource: numbering resource that is tied to a particular area.

The NCA also provides Special Numbering Resources (SNRs) which are non-geographic and non-network dependent codes used in sending data and voice. These encompass the following:

1. Toll Free Numbering Resources
2. Shared Cost Numbering Resources (SCNRs)
3. Premium Rate Numbering Resources:
4. Short Codes

Numbering Structure

The general numbering plan in Ghana follows the ITU.T E164 Recommendation known as the International Public Telecommunication Numbering Plan that defines a numbering plan for the worldwide PSTN and some other data networks; however, the numbering plan for Ghana is a closed numbering plan. E.164: is an international numbering plan for public telephone systems developed by the ITU. This allows international communication between networks.

The International Significant Numbers are limited to 15 digits, with at most the first 7 of these requiring analysis for routing and charging purposes.

The numbers available for use in connection with network and application services in Ghana are categorized as Geographic, Non-Geographic Numbering and Other Numbering Resources.

1. Geographic Numbering Resources are numbers used for services, which correspond to a discrete geographic area where the digits in certain parts of the number string indicate a specific geographical location of the person, or service being called. The use of Geographic Numbering Resources is presently limited to fixed telephony and fixed data services or other similar services.
2. Non-Geographic Numbering Resources are not associated with any discrete geographic area or location. Non-Geographic Mobile Numbering Resources follow the same format as the Geographic numbers except that they are used on wireless electronic communications networks and their structure interpretation is different.
3. Other Non-Geographic Numbering Resources, which form part of the numbering plan, are the Variable Length Short Codes (VLSCNR), Premium Rate Numbering Resources (PRNR), Toll Free Numbering Resources (TFNR), Shared Cost Numbering Resources (SCNR), Personal Numbers (PN), Machine-to-Machine Numbering Resources (M2MNR), etc.

For geographic and gon-geographic mobile numbers specified, the first digit of the numbering scheme is set out below:

First Digit(s)	Uses
“0”	Access Code (AC) for national trunk dial for

	Geographic (fixed) and Mobile Numbers.
00 or “+”	Access Code for International Direct Dialling (IDD) service.
“233”	Top Level Country Code for Ghana (used when dialling outside Ghana or when a Ghana National Number is on roaming and calling other Ghana National Numbers)

Table 1 : Use of Leading Digits and Country Code

What Was Done Before This Regime

Prior to the establishment of the current numbering regime, the Authority maintained a passive approach towards management of numbering resources with the assignment and management of numbering resources resting with the Network operators, a consequence of the era of one network operator.

The new numbering regime begun with the categorization of Special Numbering Resources (SNR) and their subsequent takeover and administration by the Authority in 2014, this was followed with the introduction of the numbering audit regime in 2015 to enable the NCA to probe, streamline and ensure efficient use and management of mobile and fixed numbering resources.

Challenges/Gaps

The Special Numbering Resources Administrative Framework and Guidelines was developed by the NCA and publicly reviewed in collaboration with the industry stakeholders and finally gazetted in December 2014.

Despite putting the administration of numbering resources into an orderly framework, this new regime brought new challenges that were unaccounted for, most notably the eligibility of applicants.

The Guidelines were designed to allow for easy tracing of responsibility by directing that only Authorised Value Added Service Providers (VASPs) were eligible to request for Short Codes.

This however resulted in VASPs abusing this position by raising the cost of these resources to their customers and resulted in the Authority suspending that criteria for eligibility. This action in turn led to complaints from VASPs, citing the Authority’s conditional enforcement of the Guidelines.

The challenge was identified as the high costs imposed by VASPs which deterred prospective applicants from applying, leading to the loss of revenue to both the Authority and the VASPs and also stifling the potential innovative solutions by the said applicants.

The Authority has since implemented a median solution, allowing any applicant to apply directly to the Authority, thereby getting numbering resources at the approved NCA fees, while requiring consent of a VASP in the application process, thereby ensuring that the assigned numbers remain traceable.

What Is Being Done Now

As indicated above, the Authority has implemented a median solution with regards to the issuance of SNRs. Currently, any applicant may apply directly to the Authority, thereby getting numbering resources at the approved NCA fee. However, applicants are required to provide consent of a VASP in the application process, through whom all services would be provisioned on the network of the desired Mobile Network Operator, thereby ensuring that the assigned numbers remain traceable.

The Authority also procured the services of Porting Access BV to develop a comprehensive numbering management system, encompassing all numbering resources included in the NECNP and the end-to-end workflows for each. The project is nearing completion, with an estimated time of completion by end of December 2020.

In the interim, customised in-house software tools have been employed to cope with SNR requests which remain frequent and high in demand.

Regulatory tools being used

From designing sustainable future-proof frameworks to monthly monitoring exercises, regulatory tools, paired with technical tools, have allowed the Authority to play its role in ensuring the fair access to resources over the years. These regulatory tools include:

Numbering Audit

The NCA has, since 2016, implemented a biannual numbering auditing process to review the usage of numbering resources over the preceding half year. This takes into account all blocks of assigned mobile numbering resources, fixed numbering resources, signalling point codes and SNRs.

Developed to capture numbering resources comprehensively, the form also includes future projections for numbering resources and possible re-farming of numbers to be made. This allows the Authority to gauge the national reserve and determine appropriate measures in maintaining the balance between issuing more resources and having available resources reserved for future use.

New applications made for mobile and fixed numbering resources are therefore reviewed together with the applicants previous numbering audit reports, and this serves as a guide to Authority in determining whether more resources need to be issued to an applicant.

More recently, it is being used as the final record to generate annual bills for use of numbering resources.

SNR Monitoring

The Authority retains a list of all issued SNRs as well as the details for which the SNRs are intended and in accordance with the SNR Guidelines, makes attempts to confirm that applicants use their assigned SNRs for the intended purposes. The Guidelines also stipulate that assigned SNRs may be reclaimed by the Authority if not in use within the first 3 months of assignment, a condition the Authority cannot easily track and enforce.

In keeping with the Authority's drive to maintain fair use of resources, the SNR Administrative Framework and Guidelines stipulates the maximum validity of a Short Code as one (1) year, with any use after this period requiring a reapplication for the resource.

However, due to SNRs being hosted on the networks of the MNOs, it is exceptionally challenging to independently verify the use of an SNR post expiry, a necessary verification for billing during reapplications/renewals. The Authority therefore relies on the information provided in the numbering audit.

In conjunction with the numbering audit data, which is a passive approach to guideline enforcement, the Authority employs a more active means. This is by internally developed tools for automated scanning of mobile networks using all available SNR ranges.

Benefit/impact: consumers, industry

1. **For consumers:**

- Access to Services (Network addressing and routing of traffic, charging etc.)
- Enables traceability of numbering resources, service providers, and services

2. **For Industry:**

- Enable fair access to SNRs for VASPs, thereby increasing participation of existing members in the VAS ecosystem

- Reducing barriers to entry into the VAS space for application service developers by consolidating numbering resources with a neutral regulator, as opposed to the previous regime which saw requests left to the discretion of network operators
- Standardized fees for numbering resources
- Ensure conformance to national and international numbering formats
- Data collection and analysis (Big data implications)
- A great neutralizer and incentive for competition
- Instrument for effective regulation